

News (cont. from p. 377)

Stellar Cannibalism

Astronomers have obtained evidence that stars can literally swallow other stars, leading to the ejection of stellar material into space and the formation of extremely close pairs, according to the National Science Foundation (NSF). The discovery supports theoretical predictions of the evolution of double stars.

While studying the central stars of planetary nebulae—disk-shaped gas clouds that vaguely resemble planets—Albert D. Grauer of the University of Arkansas at Little Rock and Howard E. Bond of Louisiana State University at Baton Rouge found that several of these central stars are actually very close stellar pairs. Previously, it had been thought that the central star in a planetary nebula was a single star that expelled a gas cloud as it neared the end of its life. Their latest discovery, the central star of planetary nebula Abell 41, consists of a pair of stars that orbit each other in 2 hours and 43 minutes. The researchers also have found three other central star pairs that have orbital periods of between 11 and 18 hours.

The discoveries support theoretical predictions of the evolution of double stars, the astronomers said. It is believed that when a star exhausts the hydrogen fuel in its interior, it expands to become a huge, cool, red giant. If a star that becomes a red giant happens to have a second star orbiting it—as at least half of all stars do—the companion star will suddenly find itself inside the outer layers of the red giant. Much as an earth satellite's orbit begins to decay once it enters the outer layers of the earth's atmosphere, the awed star would then begin a gradual, inward spiral inside the extended atmosphere of the red giant. As the captured star spirals in, it gradually speeds up the rotation of the outer layers of the red giant. This process continues until enough energy is transferred to the outer layers of the red giant to cause them to be expelled, leaving a close pair of orbiting stars surrounded by a nebula gas cloud.

The astronomers used telescopes at Kitt Peak National Observatory near Tucson, Ariz., at Cerro Tololo Inter-American Observatory in Chile, and at the Louisiana State University Observatory. Kitt Peak and Cerro Tololo are national astronomy centers funded by NSF.

NASA Budget in Congress

The House of Representatives has authorized \$16.17 million more than President Ronald Reagan proposed for the fiscal 1984 National Aeronautics and Space Administration (NASA) budget. The House NASA authorization bill (H.R. 2065) passed by voice vote on April 26. Five days earlier, the Senate Commerce, Science, and Technology Committee marked up S. 1098, the Senate's NASA authorization bill, and recommended \$17.6 million more than the Reagan proposal. The Senate is expected to vote on the bill in mid May, after which time a conference committee will iron out the differences between the House and Senate versions.

President Reagan requested a total NASA budget of \$7.106 billion; \$5.7085 billion for research and development, \$1.65 million for construction of facilities, and \$1.2475 billion for research and program management (Eos, February 15, 1983, p. 65).

The House authorized a total of \$7.2682 billion, which includes \$5.8886 billion for research and development, \$1.871 million for

construction at facilities, and \$1.2425 billion for research and program management.

The Senate committee recommended a total budget of \$7.2781 billion; \$5.8885 billion for research and development, \$1.421 million for construction of facilities, and \$1.2475 billion for research and program management.

In the five R&D categories (see table), the largest recommended increases over the president's proposal were in technology utilization (150%) and space science and applications (approximately 8%).

Within space and applications, the House authorized \$52 million more for physics and astronomy programs, with \$46 million of that increase targeted for the space telescope. In addition, all of the House's \$15 million and all of the Senate committee's \$10 million increase for planetary exploration was targeted for research and analysis. The Senate committee recommended increases to physics and astronomy programs of \$50 million for the space telescope, \$5 million for the space plasma lab, and \$5 million for research and analysis. The committee recommended cancelling \$16 million proposed by President Reagan for the solar optical telescope.—BTR

Results of NASA FY 1984 Research and Development Budget, in Millions of Dollars

Activity	Reagan Proposal	House Bill*	Senate Gommeau Markup 4/21†
Space transportation systems			
Capability development	3496.0	3571.8	3558.0
Operations	1927.4	2001.2	2022.4
Space science and applications	1570.6	1370.8	1355.6
Physics and astronomy	1068.0	1152.0	1154.0
Planetary exploration	514.8	566.6	558.6
Life sciences	205.4	220.4	216.4
Space Applications‡	59.0	59.0	59.0
Technology utilization	289.0	306.0	321.0
Aeronautics and space technology	4.0	10.0	10.0
Aeronautics	488.3	454.6	486.3
Space Technology	300.3	311.8	328.3
Tracking and data acquisition	158.0	148.0	158.0
Total research and development	5707.5	6008.8	5888.5

*The House of Representatives passed the NASA Authorization Bill, H.R. 2065, by voice on April 26.

†These figures are the results of the budget markup of the Senate version of the NASA Authorization Bill, S. 1098, by the Senate Committee on Commerce, Science, and Technology on April 21. The bill is expected to be voted on by the entire Senate by mid May.

‡Includes solid earth observations, environmental observations, materials processing in space, communications, and information systems.

Great Lakes Lab

The Great Lakes Environmental Research Laboratory (GLERL) would close under President Reagan's fiscal year 1984 budget proposal issued on January 31, 1983. GLERL, established in 1974, conducts experimental research in the field and laboratory on the physics, chemistry, and biology of the Great Lakes, their watersheds, sediments, and overlying atmosphere. Closing the lab would represent a cut of more than \$3.6 million from the ocean research program, which is part of the National Oceanic and Atmospheric Administration's (NOAA) ocean and coastal program activity. It also would mean dismissing a staff of 90, according to Eugene Aubert, director of GLERL.

Congressional action on the proposed budget cuts for all of NOAA, including the status of the laboratory, is proceeding through hearings and budget markups. The House has completed its hearings and, as Eos went to press, had scheduled a budget markup session for May 11. A Senate Appropriations subcommittee held its hearing on April 26; a budget markup has been tentatively scheduled for late May. GLERL had been proposed to be closed in the fiscal 1983 NOAA budget (Eos, February 23, 1982, p. 169), but was reinstated by Congress.

Support for continued operation of the laboratory was expressed in a letter sent by the entire Michigan congressional delegation on March 21, 1983, to the House appropriations subcommittee conducting hearings on the budget proposal to close GLERL.

Of the 15 NOAA Environmental Research Laboratories (ERL), GLERL is one of three "wet" laboratories. Present investigations include a study of the deep-sea structure of waves and their propagation characteristics through the use of 15 current meter moorings deployed in Lake Michigan. Also, the basin runoff behavior of the large watershed of Lake Ontario is under study using an independent tank-cascade model; this will develop better forecasting abilities once meteorological information has been supplied. In addition, a program is continuing which investigates the cycling, transport, and fate of toxic organic compounds. Involved in the research are 48 scientists, 50 graduate students, and 12 part-time employees who constitute a support staff.

If GLERL is closed, the fate of this research in progress is unclear. During the April 26 Senate Appropriations subcommittee hearing (Eos, May 10, 1983, p. 972), Sen.

The IMS Source Book

Guide to the International
Magnetospheric Study Data Analysis
C.T. Russell and D.J. Southwood, editors

The International Magnetospheric Study, or IMS, was a coordinated effort to advance the knowledge of the dynamics of the magnetosphere, in particular to study the response of the near-earth environment to varying conditions in interplanetary space.

This book identifies the "What, When and How" of the major IMS satellite, ground-based rocket and balloon programs and tools used in conduct of the data. Also covered are many of the conventional and innovative IMS workshops including the Combined Data Analysis Workshop—a computer based event oriented multi-data set approach that proved very successful.

This book serves both the active researcher involved heavily in the IMS from the beginning and those who would like to gain entry into the IMS study effort.

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Lowell P. Weicker, Jr. (R-Gon), questioned NOAA Administrator John V. Byrne about the impact closing the laboratory would have on environmental research in the Great Lakes. "We anticipate a certain amount of research to continue at regional universities and through other federal agencies," Byrne told Weicker. Allowing changes will result from closing the laboratory, "much of the research will continue," Byrne added.

Before the hearing, another NOAA staffer indicated that some projects would simply be terminated if the laboratory were to close, while others may be transferred to the Pacific Marine Environmental Laboratory in Seattle or to the Atlantic Ocean and Meteorological Laboratory in Miami, the other two wet laboratories in the NOAA system. GLERL Director Aubert argued that the transfer of research projects is highly unlikely. He stressed that the other laboratories are geared mostly toward heavy metal research; GLERL investigates the biology of lake systems and operates a lake hydrology research group that is unique among the ERL. Furthermore, NOAA would not be able to absorb or relocate the personnel involved, Aubert said. A source at NOAA stated that individuals would have to choose to resign, to apply for positions in other parts of NOAA, or to retire, depending on their age and years with the government. The bulk of the research could be conducted by the states in the region, but this could cause a great financial and administrative burden on the states, according to the NOAA staffer.

Silber's research into the formation of ocean basins has applications for understanding the way petroleum deposits mature. He has studied the reconstruction of movements of the continents and the subsidence of ocean basins. He is considered an expert in the interpretation of geothermal and seismic data.

The grant is part of the Shell Distinguished Chairs program, established in 1980. The chairs are not endowed, but are 5-year chairs in the sciences, engineering, business, and public affairs. Their holders are to be promising young scientists with an established reputation as outstanding performers and with potential for continuing brilliant careers, said Doris D'Amato, senior vice president of the Shell Companies Foundation. Previously, Princeton University also received a grant from Shell to support a chair in the geosciences.

Among the agencies that use the laboratory's data are the National Weather Service, the Office of Marine Pollution Assessment, the National Ocean Service of the Ocean Assessment Division, the Environmental Protection Agency, and the Army Corps of Engineers. In addition, many states, private institutions, and the general public have access to the data.

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Books

Fisica de la Tierra

Aguilera Urdiales Vallina, Alhambra, Madrid, Spain (in Spanish), v + 73 pp., 1982.

Reviewed by Gianna Lomnitz

This brief introductory textbook fills a definite need. There have been no accessible references in Spanish on general geophysics.

The level of the book requires only a knowledge of high school physics, according to the preface; however, this is not so much a high school text as a reference guide for the general reader.

The book contains four chapters: (1) Gravity and the Shape of the Earth, (2) Earthquakes and the Interior of the Earth, (3) The Magnetic field, and (4) Origins and Evolution of the Earth. The latter chapter contains most of the relevant information on plate tectonics and dynamics of the lithosphere. The sequence of chapters is somewhat awkward, since the idea of lithospheric plates is already introduced in Chapter 2. In fact, the discussion of plate tectonics contains several inconsistencies: In Figure 4-4, for example, volcanoes are shown as plumes rising from the Benioff zone and erupting offshore, on the continental slope. The text compounds the confusion: "Because of the dip angle of the sinking plate, these volcanoes are found behind the coast line. Continental rocks in the collision zone are pushed up to form large mountain ranges in some places, such as the Andes."

The first three chapters are treated in a more traditional fashion and are generally more reliable. Again, they are marred by a few confusing or inaccurate figures and statements.

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Scholarships: Lamont-Doherty Geological Observatory of Columbia University seeks a postdoctoral with strong research interests in tectonics and computational methods applicable to digital network data from a major seismic gap at a subduction zone. Participation in ongoing research program and development of future research proposals are expected. Depending on applicant's experience and qualifications, the position will be either the postdoctoral or associate research scientist level, and require, with publications or manuscripts and at least three references to: Dr. Klaas Jacob, Lamont-Doherty Geological Observatory, Palisades, NY 10564.

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Geology with emphasis on Petrology/Geophysics: The University of California, Riverside, invites applications beginning September 1, 1983. Although the initial appointment will be at a lecturer, and is annually renewable, the appointment could lead to a ladder faculty position next year.

Applicants should teach both undergraduate and graduate levels and be able to teach several courses in Petrology, Mineralogy, Geochemistry, Geology, Geophysics, etc. Required: in addition to teaching, research and service are required: full faculty membership in the University of California. Applications should submit a current curriculum vitae, names and addresses of three referees—these may agree to provide references. Applications should be complete by July 30, 1983; however, late applications may be accepted until successful candidate is appointed.

Send application to Dr. Lewis H. Cohen, Department of Earth Sciences, University of California, Riverside, California 92521.

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Bureau of Mineral Resources, Australia/Maritime Geodynamics: The Australian Bureau of Mineral Resources, Geology and Geophysics (BMR) is charged with developing an integrated, comprehensive, scientific understanding of the geology of the Australian continent and offshore areas as a basis for mineral exploration.

The Division of Marine Geosciences and Petroleum Geology undertakes a wide range of regional offshore geological and geophysical investigations, and is responsible for the analysis and interpretation of geoscience data collected by private petroleum exploration companies offshore.

The Division is seeking a Marine Geophysicist to analyse regional data on the stratigraphy, structure and evolution of Australian continental margins. Research experience in sedimentary geophysics is highly desirable. Experience in burial and thermal geochemistry analysis would be of value.

Classification will be Principal Research Scientist or Senior Principal Research Scientist level depending on the successful candidate's qualifications and experience.

QUALIFICATIONS: A Ph.D. (or equivalent) together with demonstrated research ability.

SAI/ARV: Principal Research Scientist (PRS)—\$43,830-\$47,107; Senior Principal Research Scientist (SPRS)—\$44,264-\$46,670.

CONTRACTS: Conditions of service include superannuation, long service leave, four weeks annual leave and remuneration package.

Permanency is available to persons who are neither subjects eligible for permanent residence in Australia. A term engagement would be considered for persons not meeting this criterion.

Applications together with full personal and professional details and the names of at least three referees should be sent to:

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Applications close 3 June 1983.

Postdoctoral Research Associate in Plasma Theory: The Department of Physics, University of Denver invites applications for a research position in space plasma theory group.

Candidate should have Ph.D. in plasma theory with strong background in quasilinear and nonlinear theory of plasma instabilities, including numerical methods and computer simulation techniques.

The position is suitable for a recent Ph.D. recipient with one or two years of post-doc experience with successful publication record will also be considered. The research program in space plasma theory includes kinetic, ion-beam instabilities and parametric instabilities. The project requires finite-difference calculations of space plasma field and data for theoretical support. Experience in space plasma desirable but not essential, familiarity with CRAY-1 computer is useful.

The position is available starting October 1, 1983. Your application is preferred. Salary competitive and commensurate with qualifications.

Send curriculum vitae, salary requirements and names of three referees to: Professor V.L. Paul, Department of Physics, University of Denver, Denver, CO 80208.

Research Associate: The Stanford University School of Earth Sciences and the Center for Materials Research seek research-oriented scientists for an initial three-year appointment to start approximately October 1, 1983 whose responsibilities will include [1] Supervision and maintenance of a new XRF-XRD facility; [2] Operation of a new ESCA spectrometer, and [3] Interaction with our microprobe technician in optimizing software for geological applications.

Duties will include training faculty and student users of the XRF, XRD, and ESCA, but not service work. Experience in operation of XRF, XRD, and/or electron microscope required; we will train on the ESCA. A good working knowledge of DEC System 10, RSX-11M monitor, and FORTRAN level programming is essential. Although we envision that the duties associated with this new equipment will constitute a full-time job for a year or two, we prefer Ph.D. level applicants who desire eventually to develop their own research program in conjunction with Stanford faculty.

Send resume to: Dr. Robert Flattie, Director, L.J. Jolla Institute, 8550 Villa La Jolla Drive, Suite 2150, La Jolla, California 92093.

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POSITIONS WANTED

Research Scientist in Space Physics: The Laboratory for Atmospheric and Space Physics at the University of Colorado announces openings for one or more research scientists.

The successful candidate will join our experimental research programs in solar terrestrial physics and planetary atmospheres. LASP has ongoing sounding rocket and satellite programs dedicated to the development of state-of-the-art instruments for space research.

An advanced degree is required; a background in solar, planetary or atmospheric sciences is desirable, although experience in related areas will be considered. Salary commensurate with experience.

Applications should have a Ph.D. in geophysics or other engineering/computer science with at least three years industrial experience with well log analysis.

Duties will include the development of data analysis packages for full waveform acoustic logs, initializing new data analysis techniques and directing the handling of digital data at the Earth Resources Laboratory. Individual will also be expected to supervise data transfer between ERL and members of the full waveform acoustic logging consortium.

Please state minimum salary requirements. Resumes should be submitted to:

Professor M.N. Toksoz
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Research Associate/Petrography-Petrology: To join a research effort aimed at understanding the condensation history of the solar system by mineralogical, chemical, and isotopic studies of tiny individual primitive meteorites. Applicant need not have previous research experience, but should be a superb petrographer skilled in the use of the SEM and electron probe. Successful candidate will be dedicated, productive, an effective communicator both orally and in writing, and will have a Ph.D. in Geology. Applications due by June 1, 1983.

Send name and names of three references to: L. Grossman, Department of Geophysical Sciences, University of Chicago, 5734 S. Ellis Avenue, Chicago, IL 60637.

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Geology with emphasis on Petrology/Geophysics: The University of Texas at Austin invites applications beginning September 1, 1983. Although the initial appointment will be at a lecturer, and is annually renewable, the appointment could lead to a ladder faculty position next year.

Applicants should teach both undergraduate and graduate levels and be able to teach several courses in Petrology, Mineralogy, Geochemistry, Geology, Geophysics, etc. Required: in addition to teaching, research and service are required: full faculty membership in the University of Texas at Austin. Applications should submit a current curriculum vitae, names and addresses of three referees—these may agree to provide references. Applications should be complete by July 30, 1983; however, late applications may be accepted until successful candidate is appointed.

Send application to Dr. Lewis H. Cohen, Department of Earth Sciences, University of California, Riverside, California 92521.

The University of California is an Equal Opportunity/Affirmative Action Employer.

Structural Geology/Petrology: A postdoctoral position will be available beginning September 1, 1983 in the College of Marine Studies, University of Delaware, Newark, DE. The initial appointment will be for one year with possible extension for a second year. The salary will be \$24,000-\$26,000 per year, depending on experience. Funds for the position will be available largely from a grant to NOAA to conduct and analyze data from the shelfbreak front in the Mid-Atlantic Bight. The person obtaining the appointment would be responsible for a portion of the planning and execution of the field study, much of the subsequent data analysis, interpretation, and teaching of one graduate level course in applied tectonophysics.

The successful applicant must have received his/her Ph.D. in physical tectonophysics and be closely related field by the starting date of his/her appointment. Preference will be given to applicants with direct experience in field observations.

To apply send a complete curriculum vitae and names and addresses of three referees—these should be sent to: Head of Department of Geology, University of Georgia, Athens, GA 30602.

Deadline for receipt of applications is June 20, 1983. Should suitable candidates not be found, another search may be opened.

The University of Georgia is an equal opportunity/affirmative action employer.

Structural Geology/Petrology: Lafayette College seeks a person to teach undergraduate physical and structural geology, igneous and metamorphic petrology, and sedimentary rock types, dependent on applicant's interests. Ability to teach introductory geophysics is desirable but not mandatory. Teaching load averages ten to twelve contact hours and two courses per semester. Appointment as assistant professor (Ph.D. complete) or instructor (Ph.D. pending). Send application and resume, and arrange for three reference letters to Dr. Richard W. Faas, Department of Geology, Lafayette College, Easton, PA 18042.

Lafayette College is an equal opportunity employer. M.F. Women and minorities are encouraged to apply.

Chairman—Department of Geological Sciences: The Department of Geological Sciences, Wright State University, invites applications for the position of chairman, to be appointed September 1983. We seek a dynamic individual with administrative talent and appreciation for research and practice-related educational activities. Rank is at the full professor level and no teaching load has been placed on this position. The department is active with 12 faculty and an emphasis on professional practice, while maintaining a firm commitment to basic research.

Send a letter of application, curriculum vitae and names of three referees to:

Chairman, Search Committee
Department of Geological Sciences
Wright State University
Dayton, OH 45435.

Wright State University is an affirmative action/equal opportunity employer. Closing date for position is October 31, 1983.

The successful candidate should have a solid background in both theoretical and observational seismology, as well as a minimum of three years experience in digital seismic network operation. A working knowledge of field seismological techniques, probabilistic hazard estimation, and strong motivation are desirable. A applicant must have proven ability to lead a group research effort.

Please state minimum salary requirements. Submit resumes to:

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Position in Plasma Department: Research position in the area of space and basic plasma physics with emphasis on numerical simulation is available at the University of Texas, Austin.

This basic space plasma physics group will have a strong interest in the fusion plasma physics group of the Institute for Fusion Studies at UT. Salary and rank depend on qualifications. Association with IFS will be arranged upon qualification. Send resume to:

Professor T. Tajima
Department of Physics
University of Texas
Austin, TX 78712

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The position is suitable for a recent Ph.D. recipient with one or two years of post-doc experience with successful publication record will also be considered. The research program in space plasma theory includes kinetic, ion-beam instabilities and parametric instabilities. The project requires finite-difference calculations of space plasma field and data for theoretical support. Experience in space plasma desirable but not essential, familiarity with CRAY-1 computer is useful.

The position is available starting October 1, 1983. Your application is preferred. Salary competitive and commensurate with qualifications.

Send curriculum vitae, salary requirements and names of three referees to: Professor V.L. Paul, Department of Physics, University of Denver, Denver, CO 80208.

The University of Colorado is an equal opportunity/affirmative action employer.

Applications close 3 June 1983.

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The position is suitable for a recent Ph.D. recipient with one or two years of post-doc experience with successful publication record will also be considered. The research program in space plasma theory includes kinetic, ion-beam instabilities and parametric instabilities. The project requires finite-difference calculations of space plasma field and data for theoretical support. Experience in space plasma desirable but not essential, familiarity with CRAY-1 computer is useful.

The position is available starting October 1, 1983. Your application is preferred. Salary competitive and commensurate with qualifications.

Send curriculum vitae, salary requirements and names of three referees to: Professor V.L. Paul, Department of Physics, University of Denver, Denver, CO 80208.

The University of Colorado is an equal opportunity/affirmative action employer.

Applications close 3 June 1983.

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Postdoctoral Research Associate in Plasma Theory:

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Postdoctoral Research Associate in Plasma Theory:

The Department of Physics, University of Denver invites

Meetings (cont. from p. 381)

Transport of Excessive Sediment

Much sediment transport theory is based on low and moderate sediment concentrations and may not be applicable for excessive sediment loads. The Erosion and Sedimentation Committee of AGU is sponsoring a symposium on review the state of the art for excessive sediment loads. The symposium is scheduled for the 1985 Fall Meeting to be held in San Francisco, Calif., during the week of December 5.

Some of the subjects already accepted for presentation include comparison between research on hyperconcentrate sediment loads in mainland China and the United States; excessive sediment loads during the Mount St. Helens episode; pipeline transport of slurries; and an overview of the American Society of Civil Engineers task force on the effects of high sediment concentrations on velocity profiles and transport.

Submission of additional papers dealing with the general area of transport processes or excessive sediment loads is encouraged. Abstracts should be submitted by August 15 in standard AGU format to:

Walter F. Megahan, Program Chairman
Earth Sciences Laboratory
316 East Myrtle Street
Büd, ID 83702
(telephone: commercial, 208-534-1457;
FIS, 551-1457.)

The original and two copies of the paper should be sent to:

Fall Meeting
American Geophysical Union
2000 Florida Avenue, N.W.
Washington, DC 20009

Deadline for submission of abstracts is September 14.

Papers presented at the symposium may also be published in *Water Resources Research*. Speakers who would like to have their papers considered for publication should provide a completed manuscript to the program chairman at the time of the meeting in December.

Geophysical Year
New Listings

The complete Geophysical Year last appeared in the December 21, 1982, issue.

A boldface meeting title indicates sponsorship or co-sponsorship by AGU.

November 7-8, 1985 14th Underwater Mining Institute meeting, Madison, Wis. (J. R. Moore, Marine Science Institute, The University of Texas-Austin, 200 East 26th Street, Austin, TX 78703; telephone: 512-471-4816.)

January 9-12, 1986 Chapman Conference on Natural Variations in Carbon Dioxide and the Carbon Cycle, Tarpon Springs, Fla. (Meetings, AGU, 2000 Florida Avenue, N.W., Washington, DC 20009.)

March 22-29, 1986 7th International Symposium on Equatorial Aeronomy (ISEA), Hong Kong, Sponsors, ICSU Committee on Space Research, IUGG, IAGA, IAMAP, and URSI. (S. Matsushita, Chairman, ISEA, High Altitude Observatory, NCAR, P.O. Box 9000, Boulder, CO 80307; telephone: 303-494-5131.)

August 21-29, 1986 International Radiation Symposium '84 (IRS), Perugia, Italy. Sponsor: The Radiation Commission of the International Association of Meteorology and Atmospheric Physics. (Giorgio Gori, Chairman, IRS '84, Dipartimento di Fisica, Città Universitaria, 00185 Rome, Italy; Telex: INFNRO 613255.)

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